

WHAT IS CLAIMED IS:

1. An isolated, recombinant, or non-naturally occurring polypeptide comprising a first polypeptide sequence that has at least about 95% amino acid sequence identity to at least one polypeptide sequence selected from the group consisting of SEQ ID NOS:1, 9, 12, and 92.

2. The polypeptide of claim 1, wherein the polypeptide has an ability to induce an immune response against human epithelial cell adhesion molecule (EpCAM) antigen or an antigenic fragment of human EpCAM.

3. The polypeptide of claim 1, wherein the first polypeptide sequence that has at least about 96% amino acid sequence identity to at least one polypeptide sequence selected from the group consisting of SEQ ID NOS:1, 9, 12, and 92.

4. The polypeptide of claim 2, wherein the first polypeptide sequence is selected from the group consisting of SEQ ID NOS:1, 9, 12, and 92.

5. The polypeptide of claim 2, wherein the first polypeptide sequence comprises SEQ ID NO:1.

6. The polypeptide of any one of claims 1-5, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence selected from the group consisting of SEQ ID NO:63 and SEQ ID NO:64.

7. The polypeptide of any one of claims 1-6, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence selected from the group consisting of SEQ ID NO:59 and SEQ ID NO:60.

8. The polypeptide of any one of claims 1-7, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence selected from the group consisting of SEQ ID NO:57 and SEQ ID NO:58.

9. The polypeptide of any one of claims 1-8, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence comprising SEQ ID NO:48.

10. The polypeptide of any one of claims 1-9, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence comprising SEQ ID NO:49.

11. The polypeptide of any one of claims 1-10, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence is selected from the group consisting of SEQ ID NOS:50-53.

12. The polypeptide of any one of claims 1-11, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence is selected from the group consisting of SEQ ID NOS:54-56.

13. The polypeptide of any one of claims 1-12, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence is selected from the group consisting of SEQ ID NO:61 and SEQ ID NO:62.

14. The polypeptide of any one of claims 1-13, wherein the polypeptide comprises an amino acid subsequence within said first polypeptide sequence, said subsequence is selected from the group consisting of SEQ ID NOS:65-70.

15. The polypeptide of any one of claims 1-14, wherein the polypeptide further comprises a second polypeptide sequence that has at least about 80% amino acid sequence identity to the polypeptide sequence of SEQ ID NO:2, wherein the second polypeptide sequence is positioned N-terminal to the first polypeptide sequence.

16. The polypeptide of claim 15, wherein the second polypeptide sequence has at least about 90% amino acid sequence identity to the sequence of SEQ ID NO:2.

17. The polypeptide of claim 16, wherein the second polypeptide sequence has at least about 95% amino acid sequence identity to the sequence of SEQ ID NO:2.

18. The isolated polypeptide of claim 17, wherein the second polypeptide sequence comprises the sequence of SEQ ID NO:2.

19. The polypeptide of any of claims 15-18, wherein the second polypeptide sequence comprises an amino acid subsequence within said second polypeptide sequence that is selected from the group consisting of SEQ ID NOS:71-73.

20. The polypeptide of any one of claims 15-19, wherein the second polypeptide sequence comprises an amino acid subsequence that is SEQ ID NO:71 within said second polypeptide sequence.

21. The polypeptide of any one of claims 15-19, wherein the first polypeptide sequence comprises SEQ ID NO:1 and the second polypeptide sequence comprises SEQ ID NO:2, wherein the second polypeptide sequence is positioned N-terminal to the first polypeptide sequence.

22. The polypeptide of claim 21, wherein the polypeptide comprises SEQ ID NO:5.

21. The polypeptide of any of claims 1-20, wherein the polypeptide further comprises a signal peptide sequence.

22. The polypeptide of claim 21, wherein the signal peptide sequence has at least about 75% amino acid sequence identity to the sequence of SEQ ID NO:3.

23. The polypeptide of claim 22, wherein the signal peptide sequence has at least about 90% amino acid sequence identity to the sequence of SEQ ID NO:3.

24. The polypeptide of claim 23, wherein the signal peptide sequence has at least about 95% amino acid sequence identity to the sequence of SEQ ID NO:3.

25. The polypeptide of claim 24, wherein the signal peptide sequence is SEQ ID NO:3.

26. The polypeptide of any one of claims 22-25, wherein the signal peptide sequence comprises an amino acid subsequence within said signal peptide sequence that is SEQ ID NO:75 or SEQ ID NO:74.

27. The polypeptide of claim 21, wherein the signal peptide sequence is selected from the group consisting of SEQ ID NOS:3 and 37.

28. The polypeptide of any of claims 1-27, wherein the polypeptide comprises a polypeptide sequence that has at least about 96% amino acid sequence identity to the sequence of SEQ ID NO:4.

29. The polypeptide of claim 28, wherein the polypeptide comprises the sequence of SEQ ID NO:4.

30. An isolated or non-naturally occurring polypeptide comprising a first polypeptide sequence that has at least about 96% amino acid sequence identity to at least one polypeptide sequence selected from the group consisting of SEQ ID NOS:4, 13, 32, and 78.

31. The polypeptide of any one of claims 1-30, wherein the polypeptide further comprises a transmembrane domain.

32. The polypeptide of claim 31, wherein the transmembrane domain comprises a polypeptide sequence having at least about 80% identity to a polypeptide sequence selected from the group consisting of SEQ ID NOS:15, 45, and 80.

33. The polypeptide of claim 3, wherein the transmembrane domain portion has at least about 90% identity to a polypeptide sequence selected from the group consisting of SEQ ID NOS:15, 45, and 80.

34. The polypeptide of claim 33, wherein the transmembrane domain comprises an amino acid subsequence within said transmembrane domain that is SEQ ID NO:77.

35. The polypeptide of any of claim 33, wherein the transmembrane domain comprises an amino acid subsequence within said transmembrane domain that is SEQ ID NO:77.

36. The polypeptide of claim 1, wherein the polypeptide comprises a polypeptide sequence having at least about 96% amino acid sequence identity to the polypeptide sequence of SEQ ID NO:8.

37. The polypeptide of claim 1, wherein the polypeptide comprises a polypeptide sequence having at least about 96% amino acid sequence identity to the polypeptide sequence of SEQ ID NO:14.

38. The polypeptide of claim 1, wherein the polypeptide comprises a polypeptide sequence having at least about 96% amino acid sequence identity to a polypeptide sequence selected from the group consisting of SEQ ID NOS:7 and 10.

39. The polypeptide of any of claims 31-37, wherein the polypeptide further comprises a cytoplasmic domain.

40. The polypeptide of claim 39, wherein the cytoplasmic domain comprises a polypeptide sequence having at least about 80% identity to the polypeptide sequence selected from the group consisting of SEQ ID NOS:11 and 46.

41. The polypeptide of claim 40, wherein the cytoplasmic domain comprises a polypeptide sequence having at least about 90% identity to the polypeptide sequence selected from the group consisting of SEQ ID NOS:11 and 46.

42. The polypeptide of claim 41, wherein the cytoplasmic domain comprises a polypeptide sequence having at least about 96% identity to a polypeptide sequence selected from the group consisting of SEQ ID NOS:11 and 46.

43. The polypeptide of claim 39-42, wherein the polypeptide comprises a polypeptide sequence having at least about 96% identity to a polypeptide sequence selected from the group consisting of SEQ ID NOS:6 and 34.

44. An isolated or non-naturally occurring polypeptide having an ability to induce an immune response against human EpCAM comprising a polypeptide sequence that has at least about 98% amino acid sequence identity to the polypeptide sequence of SEQ ID NO:5.

45. An isolated or non-naturally occurring polypeptide having an ability to induce an immune response against human EpCAM comprising a polypeptide sequence that has at least about 98% amino acid sequence identity to the polypeptide sequence of SEQ ID NO:4.

46. The polypeptide of claim 44, wherein the polypeptide sequence comprises one or more amino acid subsequences within said polypeptide sequence selected from the group consisting of SEQ ID NOS:47-73.

47. The polypeptide of claim 45, wherein the polypeptide sequence comprises one or more amino acid subsequences within said polypeptide sequence selected from the group consisting of SEQ ID NOS:47-76.

48. The isolated polypeptide of claim 46, wherein the polypeptide sequence comprises the following amino acid subsequences in N-terminus to C-terminus order:

- (1) a sequence selected from the group consisting of SEQ ID NOS:71-73;
- (2) SEQ ID NO:47;

- (3) SEQ ID NO:63 or SEQ ID NO:64;
- (4) SEQ ID NO:57 or SEQ ID NO:58;
- (5) SEQ ID NO:48;
- (6) SEQ ID NO:49;
- (7) a sequence selected from the group consisting of SEQ ID NOS:50-53;
- (8) a sequence selected from the group consisting of SEQ ID NOS:54-56;
- (9) SEQ ID NO:61 or SEQ ID NO:62; and optionally
- 10) SEQ ID NO:70.

49. The polypeptide of claim 48, wherein the polypeptide sequence has at least about 97% amino acid sequence identity to the sequence of SEQ ID NO:6 or SEQ ID NO:34, and the polypeptide sequence includes one or more amino acid subsequences selected from the group consisting of SEQ ID NOS:65-70.

50. The polypeptide of any one of claims 44, 46-49, wherein the polypeptide sequence comprises (1) a first cysteine-rich domain of the sequence pattern Cys Xaa Cys Xaa₍₈₎ Cys Xaa₍₇₎ Cys Xaa Cys Xaa₍₁₀₎ Cys, (2) a second cysteine-rich domain of the sequence pattern Cys Xaa₍₃₂₎ Cys Xaa₍₁₀₎ Cys Xaa₍₅₎ Cys Xaa Cys Xaa₍₁₆₎ Cys, or (3) first and second cysteine-rich domains according to the sequence patterns of (1) and (2).

51. The isolated polypeptide of any one of claims 44, 46-50, wherein the polypeptide sequence comprises an amino acid subsequence having the sequence pattern Cys Xaa Cys Xaa₍₈₎ Cys Xaa₍₇₎ Cys Xaa Cys Xaa₍₁₀₎ Cys Xaa₍₆₎ Cys Xaa₍₃₂₎ Cys Xaa₍₁₀₎ Cys Xaa₍₅₎ Cys Xaa Cys Xaa₍₁₆₎ Cys.

52. The isolated polypeptide of any one of claims 31-35, wherein the polypeptide sequence comprises a subsequence having the sequence pattern Cys Val Cys Glu Asn Tyr Lys Leu Ala Val Xaa₍₂₎ Cys Xaa₍₇₎ Cys Xaa Cys Xaa₍₁₀₎ Cys Xaa₍₆₎ Cys Xaa₍₂₆₎ Gly Leu Tyr Asp Pro Asp Cys Asp Glu Xaa₍₈₎ Cys Xaa₍₃₎ Ala Thr Cys Trp Cys Val Asn Thr Ala Xaa₍₁₂₎ Cys.

53. An isolated or recombinant polypeptide comprising the polypeptide sequence of SEQ ID NO:4, wherein said polypeptide is capable of inducing an immune response against human EpCAM or sEpCAM.

54. The polypeptide of claim 31, wherein the polypeptide sequence comprises one or more subsequences selected from the group consisting of SEQ ID NOS:47-74, 76, and 75.

55. The polypeptide of claim 54, wherein the polypeptide sequence includes the following amino acid subsequences in N-terminus to C-terminus order:

- (1) SEQ ID NO:75 or SEQ ID NO:74;
- (2) a sequence selected from the group consisting of SEQ ID NOS:71-73;
- (3) SEQ ID NO:47;
- (4) SEQ ID NO:63 or SEQ ID NO:64;
- (5) SEQ ID NO:57 or SEQ ID NO:58;
- (6) SEQ ID NO:48;
- (7) SEQ ID NO:49;
- (8) a sequence selected from the group consisting of SEQ ID NOS:50-53;
- (9) a sequence selected from the group consisting of SEQ ID NOS:54-56; and
- (10) SEQ ID NO:61 or SEQ ID NO:62.

56. The polypeptide of claim 55, wherein the polypeptide sequence further comprises an amino acid subsequence selected from the group consisting of SEQ ID NOS:65-70.

57. An isolated polypeptide that induces an immune response against human EpCAM comprising a polypeptide sequence that has at least about 96% identity to a subsequence of SEQ ID NO:4, which subsequence consists of about amino acid residues 81-265 of SEQ ID NO:4.

58. The polypeptide of claim 57, wherein the polypeptide induces an immune response against human EpCAM or an antigenic fragment of human EpCAM.

59. The polypeptide of any one of claims 57-58, said polypeptide comprising a polypeptide sequence has at least 97% amino acid sequence identity to a subsequence of SEQ ID NO:4 that consists of about amino acid residues 24-265 of SEQ ID NO:4.

60. The polypeptide of claim 59, said polypeptide comprising a polypeptide sequence that differs from the sequence of SEQ ID NO:4 in at least that Glu₄₅ of SEQ ID NO:4 is substituted with an Ala residue, wherein the Ala can occur at a position other than 22 in the polypeptide sequence due to a deletion or addition of one or more amino acid residues in the subsequence of SEQ ID NO:4.

61. The polypeptide of claim 59, wherein the polypeptide sequence differs from the sequence of SEQ ID NO:4 in at least that Glu₄₅ of SEQ ID NO:4 is substituted with an Asp residue, wherein the substitution can occur at a position other than 45 in the amino acid sequence due to a deletion or addition of one or more amino acid residues occurring in the subsequence of SEQ ID NO:4.

62. The polypeptide of claim 59, wherein the polypeptide sequence differs from the sequence of SEQ ID NO:4 in at least that Glu₄₅ of SEQ ID NO:4 is substituted with an Asn, Gln, Glu, or Lys residue, wherein the substitution can occur at a position other than 45 in the amino acid sequence due to a deletion or addition of one or more amino acid residues occurring in the portion of SEQ ID NO:4.

63. The polypeptide of any one of claims 1-48, said polypeptide comprising a polypeptide sequence has at least about 99% sequence identity to the polypeptide sequence of SEQ ID NO:4.

64. The isolated polypeptide of claim 30, wherein the amino acid sequence differs from SEQ ID NO:4 in at least one of the following substitutions:

- the substitution of Ala₆ with a Val residue, and
- the substitution of Leu₉ with a Phe residue.

65. An isolated or non-naturally occurring polypeptide comprising a polypeptide sequence that has at least about 97% amino acid sequence identity to an amino acid sequence corresponding to amino acid residues 81-265, amino acid residues 82-265, amino acid residues 24-265, or amino acid residues 1-265 of the sequence of SEQ ID NO:4, wherein said polypeptide has an ability to induce an immune response against human EpCAM.

66. The polypeptide of claim 65, the polypeptide comprising a polypeptide sequence corresponding to amino acid residues 81-265, amino acid residues 82-265, amino acid residues 24-265, or amino acid residues 1-265 of the sequence of SEQ ID NO:4.

67. An isolated polypeptide comprising the polypeptide sequence of SEQ ID NO:4.

68. The polypeptide of any one of claims 57-67, which polypeptide further comprises a transmembrane domain, said transmembrane domain comprising an amino acid sequence that has at least about 95% amino acid sequence identity to the amino acid sequence of SEQ ID NO:45.

69. The polypeptide of claim 68, which polypeptide further comprises a cytoplasmic domain, said cytoplasmic domain comprising an amino acid sequence that has at least about 95% amino acid sequence identity to the amino acid sequence of SEQ ID NO:46.

70. An isolated or recombinant polypeptide comprising the polypeptide sequence of SEQ ID NO:6.

71. The polypeptide of any one of claims 1-70, wherein the polypeptide is at least as immunogenic in a host as a polypeptide consisting essentially of a polypeptide sequence selected from the group consisting of SEQ ID NOS:36, 39-41, and 43.

72. The polypeptide of any one of claims 1-71, wherein the polypeptide induces production of antibodies capable of specifically binding human EpCAM or an antigenic fragment thereof.

73. The polypeptide of claim 72, wherein the polypeptide induces production of antibodies capable of binding the extracellular domain of human EpCAM.

74. The polypeptide of any one of claims 1-73, wherein the polypeptide induces a human EpCAM-specific T cell proliferation response.

75. The polypeptide of any one of claims 1-74, wherein the polypeptide induces production of at least one cytokine.

76. The polypeptide of any one of claims 1-75, wherein the polypeptide induces an immune response against human EpCAM that is about at least as great as the immune response induced by human EpCAM.

77. A polypeptide of any one of claims 1-76, wherein the polypeptide further comprises at least one fusion partner selected from the group consisting of an immunostimulatory cytokine peptide portion, an immune enhancing heat shock protein peptide portion, a second tumor associated antigen peptide portion, a peptide portion that increases the stability of the polypeptide, or any combination thereof.

78. The polypeptide of any one of claims 1-77, wherein the polypeptide binds a ligand for EpCAM when administered to or expressed in a mammalian host.

79. The polypeptide of any one of claims 1-78, wherein the polypeptide induces production of interferon-gamma when administered to or expressed in a mammalian host.

80. An isolated, non-naturally occurring, or recombinant nucleic acid comprising a nucleotide sequence encoding a polypeptide of any one of claims 1-79.

81. An isolated, recombinant or non-naturally occurring nucleic acid comprising a nucleotide sequence that has at least about 80% nucleotide sequence identity to a nucleotide

sequence selected from the group consisting of SEQ ID NOS:16, 19-23, 26-28, 33, 35, and 79.

82. The nucleic acid of claim 81, wherein the nucleotide sequence has at least about 85% nucleotide sequence identity to a nucleotide sequence selected from the group consisting of SEQ ID NOS:16, 19-23, 26-28, 33, 35, and 79.

83. The nucleic acid of claim 86, wherein the nucleotide sequence has at least about 90% nucleotide sequence identity to a nucleotide sequence selected from the group consisting of SEQ ID NOS:16, 19-23, 26-28, 33, 35, and 79.

84. The nucleic acid of claim 83, wherein the nucleotide sequence has at least about 95% nucleotide sequence identity to a nucleotide sequence selected from the group consisting of SEQ ID NOS:16, 19-23, 26-28, 33, 35, and 79.

85. An isolated or recombinant nucleic acid comprising a nucleotide sequence that has at least about 85% nucleotide sequence identity to a nucleotide subsequence of SEQ ID NO:19, said subsequence comprising about nucleotide residues 241-795 of SEQ ID NO:19.

86. The nucleic acid of any of claims 81-85, wherein said nucleic acid encodes a polypeptide that induces an immune response against human EpCAM or an antigenic fragment thereof.

87. An isolated or non-naturally occurring nucleic acid comprising a nucleotide sequence has, or comprises a subsequence that has, at least about 85% nucleotide sequence identity to a subsequence comprising nucleotide residues 70-795 of SEQ ID NO:19, wherein said nucleic acid optionally encodes a polypeptide that induces an immune response against EpCAM or an antigenic fragment thereof.

88. A nucleic acid encoding a polypeptide having an ability to induce an immune response against human EpCAM, said nucleic acid comprising a nucleotide sequence selected from the group consisting of the group of:

(a) a nucleotide sequence having at least about 96% sequence identity to an amino acid subsequence of SEQ ID NO:4 corresponding to amino acids 81-265, amino acids 82-265, amino acids 22-265, amino acids 24-265, or amino acids 1-265 of the polypeptide sequence of SEQ ID NO:4, or a complementary nucleotide sequence thereof;

(b) a nucleotide sequence comprising nucleotides 64-795, nucleotides 67-795, nucleotides 70-795, nucleotides 73-795, nucleotides 241-795, or 1-795 of the nucleotide sequence of SEQ ID NO:19, or a complementary nucleotide sequence or any thereof;

(c) a nucleotide sequence selected from the group consisting of SEQ ID NOS:16, 20-23, 26-28, 33, 35, and 79, or a complementary nucleotide sequence of any thereof; and

(d) a nucleotide sequence that hybridizes under at least stringent conditions over substantially the entire length of the nucleotide sequence of (a), (b), or (c).

89. The nucleic acid of claim 88, wherein the nucleic acid encodes a polypeptide that induces a T cell immune response against human EpCAM.

90. The nucleic acid of any of claims 81-89, wherein the nucleic acid encodes a polypeptide that induces production of antibodies capable of specifically binding human EpCAM or an antigenic fragment thereof.

91. The polypeptide of claim 90, wherein the encoded polypeptide induces production of antibodies capable of binding the extracellular domain of human EpCAM.

92. The nucleic acid of any of claims 81-91, wherein the nucleic acid encodes a polypeptide that induces a T cell proliferation response.

93. The nucleic acid of any of claims 81-92, wherein the nucleic acid encodes a polypeptide that induces an human EpCAM-specific T cell proliferation response.

94. The nucleic acid of any of claims 81-93, wherein the nucleic acid encodes a polypeptide that induces production of at least one cytokine.

95. The nucleic acid of any of claims 81-93, wherein the nucleic acid encodes a polypeptide that induces an immune response against human EpCAM that is about at least as great as the immune response induced by human EpCAM.

96. The nucleic acid of any one of claims 80-95, wherein the nucleic acid is a DNA or RNA.

97. The nucleic acid of any one of claims 80-96, wherein the nucleic acid is fused to a second nucleic acid that comprises a nucleotide sequence encoding a co-stimulatory polypeptide or immunostimulatory cytokine.

98. The nucleic acid of claim 97, wherein the second nucleotide sequence encodes a CD28 binding protein.

99. The nucleic acid of claim 97, wherein the second nucleotide sequence encodes a GM-CSF, IL-2, IL-3, IL-12, IL-15, IL-18 or an immunostimulatory fragment or immunostimulatory variant thereof.

100. A nucleic acid vector comprising at least one nucleic acid of any one of claims 80-99.

101. The vector of claim 100, which vector is an expression vector.

102. An expression vector comprising the vector shown in Figure 4 or Figure 5.

103. A viral vector, virus or virus-like particle (VLP) comprising at least one nucleic acid of any one of claims 80-99.

104. A viral vector, virus, or virus-like particle (VLP) comprising at least one polypeptide of any one of claims 1-79.

105. A composition comprising at least one polypeptide of any one of claims 1-79 and a carrier, diluent, or excipient, or a combination thereof.

106. The composition of claim 105, wherein the carrier, diluent, or excipient is a pharmaceutically acceptable carrier, diluent, or excipient.

107. The composition of claim 105 or 106, wherein the composition further comprises at least one adjuvant, immunostimulatory polypeptide, or cytokine, or any combination thereof.

108. A composition comprising at least one nucleic acid of any one of claims 80-99 and a carrier, diluent, excipient, or transfection facilitating agent, or combination thereof.

109. The composition of claim 108, wherein the carrier, diluent, excipient, or transfection facilitating agent is a pharmaceutically acceptable carrier, diluent, excipient, or transfection facilitating agent.

110. A composition comprising a first nucleic acid of any one of claims 80-99 and a second nucleic acid of any one of claims 80-99, wherein the first nucleic acid encodes a first polypeptide, the second nucleic acid encode a second polypeptide, the amino acid sequence of the first polypeptide differs from the amino acid sequence of the second polypeptide, and wherein each of the first and second polypeptides induces an immune response against human EpCAM, or an antigenic fragment thereof.

111. A cell comprising at least one nucleic acid of any one of claims 80-99.

112. A cell comprising a vector of claim 100, 101, or 102.

113. A composition comprising a population of antibodies induced in response to a polypeptide of any one of claims 1-79.

114. A monoclonal antibody produced in response to a polypeptide of any one of claims 1-79, wherein said polypeptide binds human EpCAM or an antigenic fragment thereof.

115. A method of inducing an immune response against human EpCAM or an antigenic fragment thereof in a subject, said method comprising administering to the subject an effective amount of at least one nucleic acid of any one of claims 80-99 or at least one polypeptide of any one of claims 1-79.

116. The method of claim 115, wherein the effective amount is sufficient to induce an immune response against human EpCAM.

117. The method of claim 115, which method further comprises administering to the subject a second effective amount of at least one nucleic acid of any one of claims 80-99 or at least one polypeptide of any one of claims 1-79.

118. The method of claim 116, wherein the second effective amount is administered to the subject after the first effective amount and at a time such that the immune response to human EpCAM in the subject is enhanced.

119. A method of inducing an immune response against human EpCAM or an antigenic fragment thereof in a subject, said method comprising administering to the subject an effective amount of at least one vector of claims 100-102, wherein the effective amount is sufficient to induce an immune response against human EpCAM.

120. A method of inducing production of antibodies that bind human EpCAM, said method comprising administering to a subject an effective amount of: (1) at least one polypeptide of claims 1-79, (2) at least one nucleic acid of any one of claims 80-99, (3) a nucleic acid vector of claim 100, 101, or 102, (4) viral vector, virus or virus-like particle (VLP) of claim 103 or 104, or a combination thereof, wherein the effective amount is sufficient to induce in the subject production of a detectable amount of antibodies that bind EpCAM.

121. A method of inducing an immune response in a subject, said method comprising administering to a subject an effective amount of: (1) at least one polypeptide of claims 1-79, (2) at least one nucleic acid of any one of claims 80-99, (3) a vector of claim 100, 101, or 102, (4) viral vector, virus or virus-like particle (VLP) of claim 103 or 104, or a combination thereof, wherein the effective amount is sufficient to induce in the subject production of a detectable amount of antibodies that bind EpCAM.

122. The method of claim 121, wherein the immune response comprises production of antibodies that specifically bind human EpCAM or an antigenic fragment thereof, proliferation of T cells, or production of one or more cytokines.

123. A method of producing an isolated polypeptide of any one of claims 1-79 comprising introducing a nucleic acid of any of claims 80-99 into a population of cells, maintaining the cells under conditions in which the nucleic acid expresses a polypeptide, and isolating the expressed polypeptide from the cells.

124. A method of inhibiting binding or interaction between human EpCAM and a ligand for human EpCAM in a subject comprising administering to the subject an effective amount of: (1) at least one polypeptide of claims 1-79, (2) at least one nucleic acid of any one of claims 80-99, (3) a vector of claim 100, 101, or 102, (4) viral vector, virus or virus-like particle (VLP) of claim 103 or 104, or a combination thereof, wherein the effective amount is sufficient such that binding or interaction between human EpCAM and the ligand are detectably inhibited in the subject.

125. A method of inhibiting binding or interaction between human EpCAM and a ligand for human EpCAM in a subject, said method comprising administering to the subject a composition of claim 113 or at least one monoclonal antibody of claim 114 in an effective amount sufficient that binding or interaction between human EpCAM and the ligand are detectably inhibited in the subject.

126. The composition of claim 110, which composition further comprises a pharmaceutically acceptable carrier, diluent, excipient, or transfection facilitating agent.

127. A method of reducing progression of a cancer in a subject in need of such treatment, said method comprising administering to the subject an amount of a composition of any one of claims 105-110 that is effective to reduce progression of the cancer.

128. A method of inhibiting re-occurrence of a disease associated with an EpCAM malignancy in a subject in need of such treatment, said method comprising administering to the subject an amount of a composition of any one of claims 105-110 to the subject that is effective in inhibiting re-occurrence of the disease.

129. A method of reducing progression of a cancer in a subject in need of such treatment, said method comprising administering to the subject an amount of a composition of claim 113 or at least one monoclonal antibody of claim 114 that is effective in reducing progression of the cancer is reduced, whereby progression of the cancer is reduced.

130. A method of inhibiting re-occurrence of a disease with an EpCAM malignancy in a subject in need of such treatment, said method comprising administering an amount of a composition of claim 113 or at least one monoclonal antibody of claim 114 that is effective in inhibiting the re-occurrence of the disease, whereby said re-occurrence is inhibited.

131. A method of inducing an immune response to human EpCAM-expressing cells in a human subject in need of such treatment, said method comprising administering to the human subject an effective amount of: (1) at least one polypeptide of claims 1-79, (2) at least one nucleic acid of any one of claims 80-99, (3) a vector of claim 100, 101, or 102, (4) viral vector, virus or virus-like particle (VLP) of claim 103 or 104, or a combination thereof, wherein the effective amount is sufficient to induce an immune response to said human EpCAM-expressing cells.

132. The nucleic acid of any of claims 80-99, wherein said nucleic acid comprises an RNA polynucleotide, said RNA polynucleotide comprising a DNA sequence selected from the group of SEQ ID NOS:16, 19-23, 26-28, 33, 35, and 79, or a complementary nucleotide sequence of any thereof, in which each thymine nucleotide residue in the DNA sequence is replaced with a uracil nucleotide residue.

133. The nucleic acid of claim 132, wherein said nucleic acid comprises a polynucleotide sequence that is complementary to said RNA polynucleotide.

134. A method of detecting human EpCAM, said method comprising contacting human EpCAM or a population of cells expressing human EpCAM with at least one polypeptide of any one of claims 1-79 conjugated to a label.

135. The polypeptide of any of claims 1-79, wherein said polypeptide is glycosylated and/or pegylated.

136. The vector of claim 100, wherein the vector comprises a plasmid, a cosmid, a phage, a virus, a virus-like particle.

137. The vector of claim 100 or 101, wherein the nucleic acid is operably linked to a promoter.

138. The vector of claim 100 or 101, said vector further comprising a polynucleotide sequence encoding a costimulator.